LWG INDICATOR CHEMICAL LIST MEMORANDUM

The LWG has reviewed the Indicator Chemical List provided by EPA to the LWG on 6/11/08 and, in large part, agree with the proposed changes to the lists of chemicals proposed for the nature and extent, loading/fate and transport, and CSM sections of the RI, as well as the hybrid modeling. The attached revised version of EPA's Summary List table includes the LWG's original list, EPA's list, and a third column (*italicized headers*) that shows a compromise list. Green highlighted cells show chemicals the LWG intends to include in the RI that EPA did not request (in general, we do not provide explanations for these additions here). The red cells show the limited number of the chemicals that EPA requests that the LWG believes will not add significant value to the RI. The rationale for our compromise list is summarized below. We would like to discuss and come to final agreement on these lists as soon as possible.

NATURE AND EXTENT (SEDIMENTS, BIOTA, SURFACE WATER, TZW) AND LOADING, FATE AND TRANSPORT LISTS

Carcinogenic PAHs

For sediment, surface water, and TZW N&E and TZW loading, EPA requests that carcinogenic and non-carcinogenic totals be presented rather than low and high-molecular weight PAH totals. We do not understand the reason for this change at this point in the RI and request that we continue with the LPAH and HPAH summed totals for the following reasons:

1. From an environmental chemistry perspective, the LPAH/HPAH classification scheme, based on the number of fused aromatic rings, allows the nature and extent and fate and transport discussions to be based on this chemical structural difference as was done in the Round 2 report.
2. Several well-established sediment quality guidelines (e.g., the WA SMS, Regional Dredged Material Management programs, PEC/TECs) are based on the LPAH/HPAH classification scheme.
3. Altering this approach now will require significant revisions to work already completed for the RI. For example, the surface water and TZW data presentations, whose data sets have been complete for some months, have been drafted based on LPAH/HPAHs summed totals. In addition, EPA's written comments on the nature and extent and fate and transport sections of the Round 2 report, where this approach was used extensively, did not call for this change.
4. The RI/FS has consistently used the LPAH/HPAH approach since its inception and this continuity is important to maintain.
5. Given all of these drawbacks, we do not see a compelling rationale for the proposed change.

Pesticides

For the sediment and biota N&E lists, EPA requests the addition of six pesticides not included in the LWG's lists – dieldrin, alpha-HCH, beta-HCH, gamma-HCH, endrin, and heptachlor epoxide. Pesticides that the LWG had included on its original list were the four DDx compound group totals, aldrin, and total chlordanes. We understand the desire to present a broader representation of the pesticide group in the RI, but we feel the focus should be on those

compounds that likely pose risk and that are reasonably widespread in sediments in the harbor. The following table gives the frequency of detection in surface sediments in the final RI surface sediment dataset for the six compound EPA requests plus total chlordanes.

RI Surface Data

Analyte	Count	Detect	Non-Detect	Overall FOD	FOD if: Tot. Clord. Det
Total Chlordanes	1,371	824	547	60%	--
Heptachlor Epoxide	1,352	102	1,250	8%	84%
alpha-HCH	1,329	213	1,116	16%	91%
beta-HCH	1,353	481	872	36%	86%
gamma-HCH	1,368	200	1,168	15%	83%
Dieldrin	1,368	267	1,101	20%	90%
Endrin	1,073	79	994	7%	62%

From a nature and extent perspective, we contend that mapping compounds with FODs less than 20% or so will not add much value to the RI. Therefore, we propose mapping the two pesticides (of the six requested by EPA) that have FODs ≥ 20; these are dieldrin and beta-HCH [gamma-HCH has been added to the F&T lists and we can include it instead of beta-HCH in N&E if that consistency is preferred]. Note, also, that detected values of this group of compounds are generally collocated with detected values of chlordane. The final column in the above table shows the FOD for this suite ranges from 62 to 91% in samples where chlordanes are detected and therefore chlordane distribution should be a good surrogate for the distribution of these other pesticides.

HYBRID MODEL LIST

The LWG does not see utility in modeling aldrin given the low number of detected values (N=3) that exceeded the SQGs based on EPA's evaluation of the dataset. We also propose modeling the metals arsenic and mercury and not modeling lead based on a consideration of risk and the primary objective of the modeling to evaluate remedial alternatives. Although we agree with EPA that arsenic risk appears to be mostly driven by background levels, we see value in modeling at least one such compound as a method to understand the model's ability to accurately portray fate and transport of chemicals where background is a predominant component.

CONCEPTUAL SITE MODEL (CSM) LIST

The LWG believes that the primary objective of the CSM section of the RI is to synthesize information on the cross-media distribution, loading, fate and transport, and potential sources of the chemicals in harbor sediments that pose significant risk to human health and the environment. The LWG's proposed compromise CSM list includes chemicals that we anticipate will capture the major risk throughout the site. EPA's has indicated that the CSM list should also include chemicals that are representative of each chemical class and/or have widespread harbor sources, regardless of the risk they pose. While the LWG does not agree with this rationale, we have included a number of these compounds (e.g., Cu, TBT) on the CSM list in the interest of reaching agreement on the CSM chemical list.

There are four chemicals that EPA requests that we have not included on the CSM list. These include two metals (lead, zinc) and two pesticides (dieldrin and gamma-HCH). Both metals and pesticides are already represented by two chemicals on the proposed list (chromium and copper, and total DDx and total chlordanes). Lead and zinc likely share sources in the harbor with copper (e.g., boat and metal yards) and their behavior and distribution in sediments should track such that copper is a reasonable surrogate for this group. Regarding the pesticides, as noted in the table above, detected values of both dieldrin (90%) and gamma-HCH (83%) are strongly collocated with detected values of total chlordanes which should function as an effective surrogate for these two compounds.

Chemical Indicator Lists

Chemical	EPA Sediment Indicator Chemical	LWG Sediment Indicator Chemical	*LWG Sediment Proposed Compromise*	EPA Biota Indicator Chemical	LWG Biota Indicator Chemical	*LWG Biota Proposed Compromise*	EPA Surface Water Indicator Chemical	LWG Surface Water Indicator Chemical	*LWG Surface Water Proposed Compromise*	EPA TZW Indicator Chemical	LWG TZW Indicator Chemical	*LWG TZW Indicator Chemical Proposed Compromise*	EPA Loading	LWG Loading	*LWG Loading Proposed Compromise*	EPA TZW Loading	LWG TZW Loading	*LWG TZW Loading Proposed Compromise*	EPA Equilibrium Partitioning Calculations	LWG Equilibrium Partitioning Calculations	*LWG Equilibrium Partitioning Proposed Compromise*	EPA Hybrid Model Chemicals	LWG Hybrid Model Chemicals	*LWG Hybrid Model Chemicals Proposed Compromise*	EPA CSM Chemicals	LWG CSM Chemicals	*LWG CSM Chemicals Proposed Compromise*
Conventionals																											
Cyanide										X	X	X					X										
Perchlorate										X	X	X					X										
Phenols																											
Phenol		X												X													
Metals																											
Aluminum											X						X										
Arsenic	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X		X	X		??	X
Barium										X	X	X				X	X	X									
Cadmium	X		X	X		X				X	X	X				X	X	X									
Chromium	X	X	X	X	X	X		X					X	X	X				?						X		X
Copper	X	X	X	X		X		X	X	X		X	X	X	X	X		X	?						X		X
Lead	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	?		X	X	X		X		
Manganese										X		X				X		X									
Mercury	X	X	X	X	X	X					X		X	X	X		X		?		X			X			
Nickel	X	X	X					X		X		X	X	X	X	X		X	?								
Thallium											X						X										
Zinc	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	?						X		
Organometallic Compounds																											
Tributyltin ion	X	X	X	X	X	X							X	X	X				?		X	X		X	X		X
SVOCs																											
Bis(2-ethylhexyl)phthalate	X	X	X	X	X	X							X	X	X				X	X	X	X	X	X	X		X
Dibutyl phthalate		X												X													
Butylbenzyl phthalate	X		X																								
1,2-Dichlorobenzene										X	X	X				X	X	X									
1,4-Dichlorobenzene											X						X										
Pentachlorophenol	X		X										X		X												
Hexachlorobenzene	X	X	X	X		X	X	X	X				X	X	X					X							
PAHs																											
2-Methylnaphthalene		X												X			X						X			
Acenapthene																	X										
Anthracene																	X										
Benzo(a)anthracene																	X										
Benzo(a)pyrene		X	X		X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Benzo(b)fluoranthene																	X										
Benzo(g,h,i)perylene																	X										
Benzo(k)fluoranthene																	X										
Chrysene																	X										
Dibenzo(a,h)anthracene																	X										
Fluoranthene																	X										
Fluorene																	X										
Indeno(1,2,3-cd)pyrene																	X										
Naphthalene			X							X		X	X	X	X	X	X	X	X		X	X		X			
Phenanthrene		X	X											X			X										
Pyrene																	X										
Total Carcinogenic PAHs	X						X			X						X											
Total Non-Carcinogenic PAHs	X						X			X						X											
Total HPAHs		X	X					X	X		X	X					X	X									
Total LPAHs		X	X					X	X					X			X	X									
Total PAHs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X	X
Petroleum Hydrocarbons																											
TPH (Total)	X	X	X										X	X	X												
TPH (Residual)	X	X	X							X	X	X	X	X	X		X										
TPH (Diesel)	X	X	X							X	X	X	X	X	X		X										
TPH (Gas)										X	X	X					X										
Pesticides																											
Aldrin	X	X	X	X	X	X	X	X	X				X	X	X				X	X	X	X					
Dieldrin	X		X	X		X	X		X				X		X				X		X				X		
Alpha - Hexachlorocyclohexane	X			X																							
Beta - Hexachlorocyclohexane	X		X	X		X																					
Gamma - Hexachlorocyclohexane	X			X									X		X				X		X				X		
Endrin	X			X																							
2,4'-DDD																	X										
2,4'-DDE																	X										
2,4'-DDT																	X										
4,4'-DDE																	X										
4,4'-DDD														X			X			X			X				
4,4'-DDT														X			X			X			X				
Sum DDD	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X			
Sum DDE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
Sum DDT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X			
Total DDTs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X	X
Heptachlor Epoxide	X			X																							
Chlordane (Total)	X	X	X	X	X	X	X	X	X				X	X	X				X	X	X				X		X
Dioxin and PCBs																											
Modeled PCB Congener #1														X						X			X	X			
Modeled PCB Congener #2														X						X			X	X			
Total PCB Aroclors														X													
Total PCB Congeners														X													

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Total PCBs	X	X	X	X	X	X	X	X	X				X	X	X				X	X	X	X			X	X	X
Total PCBs (TEQ)	X	X	X	X	X	X	X	X	X				X	X	X				X		X						
Dioxin TEQ	X	X	X	X	X	X	X	X	X				X	X	X				X	X	X				X		X
Total Dioxins/Furans																									X	X	
Herbicides																											
Silvex™										X		X															
VOCs																											
1,1-Dichloroethane											X						X										
1,2-Dichloroethane										X	X	X				X	X	X									
1,1,2-Trichloroethane										X	X	X				X	X	X									
1,2,4-Trimethylbenzene										X		X				X		X									
Benzene										X	X	X				X	X	X									
Carbon disulfide										X		X				X		X									
Chlorobenzene										X	X	X				X	X	X									
Chloroethane										X	X	X				X	X	X									
Chloroform										X	X	X				X	X	X									
cis-1,2-Dichloroethene										X	X	X				X	X	X									
trans-1,2-Dichloroethene											X						X										
Methylene Chloride										X	X	X				X	X	X									
Ethylbenzene										X	X	X				X	X	X									
Toluene										X	X	X				X	X	X									
Trichloroethene										X	X	X				X	X	X									
Tetrachloroethene											X						X										
Vinyl chloride										X	X	X				X	X	X									
m,p-Xylene											X						X										
o-Xylene											X						X										
Total xylenes										X	X	X				X	X	X									

Notes:
= non-overlapping selections
= EPA chemical request that the LWG questions based on the rationale provided in the accompanying technical memorandum
= LWG chemical addition that EPA does not request